Wucheng Sun

PHD STUDENT

Profile

I am a **2nd year PhD student**, majoring in **Geological Engineering**, aiming to achieve better performance in **deep, hard rock drilling** with **impregnated diamond bits**.

My research interest is **wear damage of diamonds & metal matrix composites**, with which I try to solve through the application of novel analytical methods invloving **image analysis** and **data analysis** based on **machine learning/deep learning**.

Education

Bachelor of Engineering, China University of Geosciences

SEPTEMBER 2014 — JUNE 2018

- Got the university-level outstanding undergraduate thesis award (5%): ***Application of UFD theory and optimization of fracturing parameters in low permeability reservoir*** (Undergraduate thesis about hydraulic fracturing)

Master of Engineering, China University of Geosciences

SEPTEMBER 2018 — JUNE 2020

- Worked on a collaborative project about Green exploration in hydrogeological drilling: ***Development and application of automatic mud circulation purification device for green exploration hydrogeological drilling*** (Project)

PhD of Engineering, China University of Geosciences

SEPTEMBER 2020 — PRESENT

- Working on a NSFC research project about wear of diamond bits: ***Study on the wear behavior of hot-pressed WC-Cu based impregnated diamond bit under hydraulic percussive-rotary drilling condition*** (Project).

Publication

[1] Chai, X., **Sun, W.**, Duan, L., Dong, G., Zang, L. (2019). **Design and Development of Mechanical System for an Automatic Mud Circulation and Purification Device[J]. Metal Mine, 48(07): 182-188.** (Chinese) *http://doi.org/10.19614/j.cnki.jsks.201907030*

[2] Wang, Z., Fang, X., **Sun, W.**, Duan, L., & Tan, S. (2021). **D-Optimal Mixture Design of Fe-Based Pre-Alloyed Diamond Bit Matrix with Low Liquid Phase Content.** ***Journal of Superhard Materials*****, *43*(4), 265-277.** *http://doi.org/10.3103/S1063457621040080*

[3] **Sun, W.**, Gao, H., Tan, S., Wang, Z., & Duan, L. (2021). **Wear detection of WC-Cu based impregnated diamond bit matrix based on SEM image and deep learning.** ***International Journal of Refractory Metals and Hard Materials*****, *98*, 105530.** *https://doi.org/10.1016/j.ijrmhm.2021.105530*

Research Experience

- **Powder Metallurgy** & **Hot Pessing**, Machanical Testing
- **SEM**, **XDS**, **XRD**, **Raman Spectrum**
- **Quantitative Analysis** of Tool Wear based on SEM images and Deep Learning
- **Mechanical Property Prediction** of Sintered Tools based on Deep Learning

Details

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NATIONALITY

Chinese

Research Interests & Skills

- Diamond Tools
- Metal Matrix Composite
- Powder Metallurgy
- Friction & Wear
- Machine Learning
- Deep Learning
- Data Analysis
- Image Analysis
- Python

Languages

- Chinese (Native)
- English (IELTS = 7.0)

Personal Website

https://sunwucheng.com